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FILING DATE:	**July 19, 2006**
ART UNIT:	**1752**
DOCKET NO.:	**2156-301A**
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Florence S. Chamoures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Rustom S. Kanga		Docket No.:	2156-301A
Serial No.:	10/586,414	Examiner:	C. Hamilton
Filing Date:	July 19, 2006	Art Unit:	1752

Title: Photosensitive Printing Sleeves and Method of Forming the Same

Mail Stop Appeal Brief Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL

Enclosed please find the following items regarding the above referenced patent application:

- Appeal Brief Under 37 C.F.R. Section 41.37 (32 Sheets)

Respectfully submitted,

By: _____

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Rustom S. Kanga		Docket No.:	2156-301A
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APPEAL BRIEF UNDER 37 C.F.R. SECTION 41.37

Applicant filed a Notice of Appeal from the last decision of the Examiner on April 1, 2008. Applicant submits herein an Appeal Brief for the above captioned application pursuant to 37 C.F.R. Section 41.37.

Please charge Deposit Account No. 50-0447 in the amount of **$510**, plus any deficiencies for the filing of the Appeal Brief.

1. Real Party in Interest:

The owner of record of the application under appeal and the real party in interest is MacDermid Printing Solutions, LLC., a corporation of Connecticut, as a result of an assignment dated July 10, 2006, which has been recorded at the U.S.P.T.O. at Reel 018330, Frame 0683.

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2. **Related Appeals and Interferences:**

There are no related appeals, interferences, or judicial proceedings known to Appellant, Appellants' legal representative or Assignee.

3. **Status of Claims:**

Claims 1-5:	Canceled
Claims 6-10:	Pending
Claim 11:	Canceled
Claims 12-25:	Pending
Claim 26:	Canceled

Thus, claims 6-10 and 12-25 are currently pending and are subject of the instant appeal.

All of the pending claims 6-10 and 12-25 have been and are finally rejected. A copy of pending claims 6-10 and 12-25 is provided in the Claim Appendix.

4. **Status of Amendments:**

All claim amendments have been entered. The claims were last amended on September 20, 2007 and the amendments were entered.

5. **Summary of the Claimed Subject Matter:**

The invention is directed generally to a method of making a hollow cylindrical printing sleeve to improve image fidelity and character geometry of the relief image formed on the arcuate surface of the cylindrical printing sleeve.

More specifically, the invention is directed to pending independent claim 6:

A method of making a hollow cylindrical printing sleeve, the method comprising:

a) providing a photosensitive printing element comprising:

i) a hollow cylindrical support layer, the hollow cylindrical support layer comprising an actinic radiation absorbing compound uniformly distributed throughout;

ii) at least one layer of photopolymerizable material deposited on the hollow cylindrical support layer; and

iii) a masking layer on top of the at least one layer of photopolymerizable material that absorbs radiation at a wavelength used to polymerize the layer of photopolymerizable material;

b) removing portions of the masking layer by exposing the masking layer to laser radiation at a selected wavelength and power;

c) exposing the layer of photopolymerizable material to actinic radiation through the hollow cylindrical support layer to create a floor layer of polymerized material;

d) exposing the surface of the cylindrical sleeve to at least one source of actinic radiation to polymerize the portions of the layer of photopolymerizable material revealed during laser ablation of the masking layer, wherein the at least one source of actinic radiation comprises one or more collimated sources of actinic radiation; and

e) developing the photosensitive printing element to remove the masking layer and the unpolymerized portions of the layer of photopolymerizable material to create a relief image on the surface of the photosensitive printing element;

wherein light rays emanating from the at least one source of actinic radiation strike the photosensitive printing element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact.

(See generally specification at page 4, lines 6-25, page 7, lines 14-17 and page 11, lines 4-6)

Support for dependent claims 7-10 and 12-15 can be found in the specification as follows:

Claim 7 **(see page 7, lines 1-2)**
Claim 8 **(see page 7, lines 7-20)**
Claim 9 **(see page 8, lines 24-26)**
Claim 10 **(see page 8, lines 26-28)**
Claim 12 **(see page 10, lines 20-23)**
Claim 13 **(see page 11, lines 11-18)**
Claim 14 **(see page 10, lines 27-30)**
Claim 15 **(see page 11, lines 11-18)**

The invention is also directed to pending independent claim 16:

A method of making a hollow cylindrical printing sleeve, the method comprising:

a) providing a cylindrical photosensitive printing element comprising:

i) a hollow cylindrical support layer;
ii) at least one layer of photopolymerizable material deposited on the hollow cylindrical support layer; and

iii) a masking layer on top of the at least one layer of photopolymerizable material that absorbs radiation at a wavelengths used to polymerize the layer of photopolymerizable material;

b) removing portions of the masking layer by exposing the masking layer to laser radiation at a selected wavelength and power;

c) exposing the surface of the cylindrical sleeve to at least one source of actinic radiation to polymerize the portions of the layer of photopolymerizable material revealed during selective laser removal of the masking layer; wherein the at least one source of actinic radiation comprises one or more collimated sources of actinic radiation;

d) developing the photosensitive printing element to remove the masking layer and the unpolymerized portions of the layer of photopolymerizable material to create a relief image on the surface of the photosensitive printing element;

wherein light rays emanating from the at least one source of actinic radiation strike the photosensitive printing element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact.

(See generally specification at page 4, lines 6-25, page 7, lines 14-17 and page 11, lines 4-6)

Support for dependent claims 17-25 can be found in the specification as follows:

Claim 17 **(see page 4, lines 6-25)**

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Claim 18 **(see page 7, lines 1-2)**

Claim 19 **(see page 7, lines 1-2)**

Claim 20 **(see page 7, lines 7-20)**

Claim 21 **(see page 8, lines 24-26)**

Claim 22 **(see page 8, lines 26-28)**

Claim 23 **(see page 11, lines 11-18)**

Claim 24 **(see page 10, lines 27-30)**

Claim 25 **(see page 11, lines 11-18)**

6. Grounds of Rejection To Be Reviewed on Appeal

Whether claims 6-10 and 13-14 are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,413,699 to Kanga (hereinafter "Kanga") in view of U.S. Patent No. 5,262,275 to Fan (hereinafter "Fan") and U.S. Patent No. 5,798,019 to Cushner (hereinafter "Cushner"), further in view of U.S. Patent No. 3,619,601 to Gush (hereinafter "Gush"), U.S. Patent No. 3,614,450 to Werber (hereinafter "Werber"), U.S. Patent No. 6,180,325 to Gelbart (hereinafter "Gelbart") and U.S. Patent No. 6,664,999 to Ohba (hereinafter "Ohba") and further in view of U.S. Patent No. 5,686,230 to Nellissen (hereinafter "Nellissen"), U.S. Patent No. 6,766,740 to Wier (hereinafter "Wier"), U.S. Patent No. 3,217,625 to Trump (hereinafter "Trump"), U.S. Patent No. 3,645,179 to Karol (hereinafter "Karol") and U.S. Patent No. 3,645,178 to Speicher (hereinafter "Speicher").

Whether claim 12 is unpatentable under 35 U.S.C. §103(a) over Kanga in view of Fan and Cushner, further in view of Gush, Werber, Gelbart and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of U.S. Patent No. 4,868,090 to Kitamura (hereinafter "Kitamura") in view of U.S. Patent No. 2,791,504 to Plambeck (hereinafter "Plambeck") and U.S. Patent No. 1,986,052 to Ferree (hereinafter "Ferree").

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Whether claim 13 is unpatentable under 35 U.S.C. §103(a) over Kanga in view of Fan and Cushner, further in view of Gush, Werber, Gelbart and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of Kitamura in view of Plambeck and Ferree.

Whether claim 15 is unpatentable under 35 U.S.C. §103(a) over Kanga in view of Fan and Cushner, further in view of Gush, Werber, Gelbart and Ohba, further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of Kitamura in view of Plambeck and Ferree.

Whether claims 16-17 and 21-25 are unpatentable under 35 U.S.C. §103(a) over Fan in view of Cushner and further in view of Plambeck and Ferree and further in view of Nellissen, Wier, Trump, Karol and Speicher.

Whether claims 17-20 are unpatentable under 35 U.S.C. § 103(a) over Fan in view of Cushner and further in view of Plambeck and Ferree, further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of Kanga.

7. Argument

a. Rejection of Claims 6-10 and 13-14 under 35 U.S.C. §103(a) over Kanga in view of Fan and Cushner and further in view of Gush, Werber, Gelbart and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher.

The present invention relates generally to a method of making a hollow cylindrical printing sleeve that includes the step of exposing the surface of the cylindrical sleeve to at least one source of actinic radiation to polymerize the portion of the layer of photopolymerizable material revealed during the laser ablation of the masking layer wherein the at least one source of actinic radiation comprises one or more collimated sources of actinic radiation such that the light rays emanating from the at least one source

of actinic radiation strike the photosensitive element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact (see claim 6).

As discussed in Appellant's disclosure (see e.g., page 3, lines 9-21), the present invention is directed to methods of improving image fidelity and character geometry of the relief image formed on arcuate surfaces such as photoimageable printing sleeves.

The Examiner asserts that the combination of Kanga, Fan and Cushner describes all of the features of the claimed invention except for the use of collimated light for actinic radiation and wherein the light rays emanating from the source of light strike the photosensitive printing element at a substantially perpendicular angle to the arcuate surface.

The Examiner uses Gush, Werber, Gelbart, Ohba, Nellissen, Wier, Trump, Karol and Speicher to cure the deficiencies of Kanga, Fan and Cushner and asserts that the combined teachings of these references suggest that it would have been obvious to use collimated light as well to strike the photosensitive printing element at a substantially perpendicular angle to the arcuate surface to obtain a more perfect image.

Appellant respectfully disagrees that the combinations of references cited by the Examiner describes or suggests all of the features of the claimed invention.

As set forth above, Appellant's claims are directed to a method of making a hollow cylindrical printing sleeve that includes the step of

> exposing the surface of the cylindrical sleeve to at least one source of actinic radiation to polymerize the portions of the layer of photopolymerizable material revealed during selective laser removal of

> the masking layer; *wherein the at least one source of actinic radiation comprises one or more collimated sources of actinic radiation*;

and further recites that

> light rays emanating from the at least one source of actinic radiation *strike the photosensitive printing element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact.*

In order to establish a *prima facie* case of obviousness the test is whether the references, when taken as a whole, would have suggested Appellant's invention to one of ordinary skill in the art at the time the invention was made. See *In re Merck & Co.*, 231 U.S.P.Q. 375 (Fed. Cir. 1986). In addition, the key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious.

Appellant respectfully submits that the Examiner has not established a *prima facie* case of obviousness because the references, when taken as a whole, would not have suggested Appellant's invention to one of ordinary skill in the art at the time the invention was made. In particular, the Examiner has not established a *prima facie* case of obviousness with regards to the use of actinic radiation comprises of one or more collimated sources of actinic radiation wherein the light rays emanating from the one or more sources "strike the photosensitive printing element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact."

The Examiner has cited nine references (Gush, Werber, Gelbart, Ohba, Nellissen, Wier, Trump, Karol and Speicher) to cure the deficiencies of Kanga, Fan and Cushner and to demonstrate that the recitation of collimating the one or more light sources so that

that the light rays strike the arcuate photosensitive printing element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact is obvious in view of the prior art.

Firstly, Appellants note that at least Wier, Gush and Werber only disclose flat photosensitive printing elements and thus do not recognized any of the benefits of the present invention in improving image quality when imaging an arcuate printing surface. Thus, the combination of these references with Kanga, Fan and Cushner does not suggest the feature of collimating the light so that the light rays strike the arcuate photosensitive printing element at a substantially perpendicular angle to the arcuate surface.

Wier also does not describe or suggest a collimated light source as describe in the present invention wherein the collimated light source is mounted adjacent to the photosensitive printing element to be imaged. Instead, Wier describes a polarizer (collimator) positioned between the photosensitive layer and the masking layer. Thus Wier does not describe a masking layer on top of the photopolymerizable layer because the polarizer is positioned between the masking layer and the photosensitive layer. In contrast to the present invention, Wier does not describe a separate collimated light source but rather only describe a polarizer that is intermediate to the mask layer and the photosensitive layer. Thus, Appellants respectfully submit that Wier does not remedy any of the deficiencies of the cited prior art with regards to improving image quality when imaging an arcuate printing surface and the combination of Wier with Kanga, Fan and Cushner does not describe or suggest all of the features of the claimed invention.

Furthermore, both Werber and Gush are directed to conventional platemaking processes using liquid photosensitive compositions. There is no teaching or suggestion that such liquid photosensitive compositions would be usable in making seamless printing sleeves as in the present invention. Moreover, both Werber and Gush are directed to planar printing elements and thus do not solve the problem of collimating the source of actinic radiation strikes the printing element at an angle that is substantially

perpendicular to the surface so that image quality can be improved. The Examiner asserts that Werber and Gush were cited as teaching the use of collimated light sources being well known in the relief printing art to form finer images. However, as discussed above, neither Werber nor Gush describe cylindrical (i.e., arcuate) printing surfaces but rather only discuss planar printing surfaces and thus do not cure the deficiencies of Kanga, Fan and Cushner with regards to improving image quality of arcuate printing surfaces.

Gelbart also does not solve the problems of Kanga, Fan and Cushner. The Examiner asserts that Gelbart is applied as teaching the art recognized use of a reflector to collimate exposure light. However, Appellant respectfully submits that Gelbart does not recognize the problem of the loss of image quality when the source of actinic radiation hits the photocurable surface at an angle instead of perpendicular to the photocurable surface when exposing a curved or arcuate printing surface to actinic radiation. Furthermore, Gelbart also does not describe or suggest a seamless printing element but rather only a planar printing element that can be wrapped around a printing cylinder in one embodiment of his invention. Thus, the printing element of Gelbart is not arcuate as in the present invention but rather is a flat printing element that is wrapped around an arcuate surface. Gelbart does not cure any of the deficiencies of Kanga, Fan, Cushner, Werber and Gush and thus also, alone or in combination, does not anticipate or render obvious the claimed invention.

Ohba also does not cure the deficiencies of Kanga, Fan and Cushner. The Examiner asserts that Ohba is cited to shown one known form in which collimated light is produced for forming printing plates and is relevant to the issue of how to collimate light with respect to cylinders. Appellants respectfully disagree with the Examiner's asserts, at least because Ohba does not describe collimating the source of actinic radiation for the same reason as in the present application. The light source in Ohba is collimated to record an image on the surface, <u>not</u> to expose the printing element to actinic radiation after the image has been created in the printing element. Thus, Ohba

also does not recognize the problem of loss of image quality when the source of actinic radiation hits the printing surface at an angle as discussed above and also does not cure any of the deficiencies of the cited prior art of Kanga, Fan, Cushner, Werber, Gush and Gelbart.

Furthermore, Nellissen does not in fact describe a cylindrical element but rather describes a **spherical** element (see e.g., col. 2, lines 61-63). Furthermore, as seen in Figure 2, the light is not being collimated so that it strikes the element at an angle that is substantially perpendicular to the surface of the element at the point of impact. As seen in Fig. 2, even the reflected (i.e., collimated) light is striking the element at an angle that is not perpendicular to the point of impact. Thus, Nellissen does not describe or suggest a cylindrical printing element nor that the reflected light strikes the element at an angle that is substantially perpendicular at the point of impact and thus does not cure any of the deficiencies of Kanga, Fan, Cushner, Werber, Gush or Gelbart.

The Examiner asserts that Nellissen is relevant in that the surface is curved and that it is sufficiently equivalent to a cylindrical surface as to be drawn to essentially the same problem and is thus properly applied. The Examiner further asserts that the claimed invention is not limited to "perpendicular" but instead to "substantially perpendicular" and that Appellant gives no guidance as to what substantially adds to perpendicular in the disclosure. Appellant respectfully disagrees with the assertions of the Examiner in this regard. Appellant respectfully submits that the guidance as to the meaning of substantially perpendicular can be found in Figures 2 and 4 of the disclosure which demonstrates that the collimated light hits the surface at what appears to be a perpendicular angle and that substantially is thus indicative of the light being nearly perpendicular to the surface of the arcuate printing element. Furthermore, the disclosure indicates that the light rays hit the arcuate surface at an angle that is substantially perpendicular at the point of impact such that a relief image printing element is produced having higher image quality. It can be seen from Fig. 2 of Nellissen that the light is not hitting the surface at a substantially perpendicular angle but instead at an angle that is at

an angle a number of degrees from perpendicular and thus Nellissen does not cure any of the deficiencies of the other cited prior art and does not provide a teaching in combination with the other cited references that anticipates or renders obvious the claimed invention.

Trump does not cure any of the deficiencies of Kanga, Fan, Cushner, Werber, Gush, Gelbart and Nellissen noted above. In particular, Trump is imaging the internal surface of a cylindrical element, not the external surface as in the present invention and thus is not combinable with Kanga, Fan, Cushner, Werber, Gush, Gelbart and Nellissen in the manner suggested by the Examiner. Trump is also not concerned with imaging a photosensitive printing element but is instead concerned with high speed high resolution equipment used in the reproduction of film strips of the type employed in aerial reconnaissance. Thus, Trump is not concerned with solving the same problems as the instant invention and thus, alone or in combination with Kanga, Fan, Cushner, Werber, Gush, Gelbart and Nellissen does not anticipate or render obvious the claimed invention. The Examiner asserts that Trump shows the known method of using a layer of tubular ports, passages or openings though which light would travel to a surface to collimate light into parallel beams in order to strike a cylindrical surface to form sharp images on an arcuate surface and thus the problem solved by Trump is essentially the same as loss of image fidelity when striking a curved surface. However, Appellant respectfully submits that as seen in Figure 1, it can be seen that the light does not strike the surface at an angle that is substantially perpendicular and thus does not address the issue of image fidelity and further for this reason does not anticipate or render obvious the claimed invention, alone or in combination with the other references cited.

Finally, neither Karol nor Speicher cure any of the deficiencies of the prior art noted above. In particular, Karol and Speicher provide for exposing a photoresist coated cylinder by placing the cylinder between an outer mask and an inner mask (Fig. 2) and using conical mirrors to reflect the light so that it strikes either the mask or passes through the mask to impinge on the surface of the cylinder and are relevant for teaching

the use of collimated light to perfect an image. However, neither Karol nor Speicher describe or suggest a method that is combinable with Kanga, Fan, Cushner, Werber, Gush, Gelbart and Nellissen to achieve the claimed invention because Karol and Speicher are coating the internal surface of the cylinder and not just the outside surface, which is very different from the claimed method of collimating light directed to an outside arcuate surface of the photosensitive printing element and are thus not combinable or applicable in the manner indicated by the Examiner. Furthermore, neither Karol nor Speicher describe a mask that is part of the cylindrical printing element and that is created from a layer in the cylindrical printing element. Instead, Karol and Speicher describe a mask that is "loosely mounted" relative to the cylinder. Because the mask is only loosely mounted, it is not in intimate contact with the surface of the printing cylinder and it cannot be shown that resolution would be improved as in the present application. Thus, Appellant respectfully submits that the teachings of Karol and Speicher cannot be combined with Kanga, Fan, Cushner, Werber, Gush, Gelbart and/or Nellissen to anticipate or render obvious the clamed invention.

For all of these reasons, the rejection of claims 6-10 and 13-14 as being unpatentable over Kanga in view of Fan and Cushner, further in view of Gush, Werber, Gelbart and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher should be reversed.

b. Rejection of Claim 12 under 35 U.S.C. §103(a) over Kanga in view of Fan and Cushner and further in view of Gush, Werber, Gelbart and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of Kitamura in view of Plambeck and Ferree.

The Examiner further asserts that there is no disclosure in Kanga, Fan or Cushner to expose the entire surface of the photosensitive printing element to actinic radiation at one time but that it is known in the art as taught by Kitamura. The Examiner concludes that the use of a quick exposure instead of a scanning exposure would have been prima

facie obvious to save time in imaging the surface of the cylinder for exposure in a method such as that set forth in Wier, Trump or Nellissen.

Firstly, because claims 6-10 and 13-14 are believed to be allowable over the prior art of record for the reasons provided above, claim 12 which depends from claim 6 is also believed to be allowable over the prior art of record and the rejection of claim 12 over the prior art of record should be reversed.

Furthermore, Kitamura does not describe or suggest collimating the lights sources in their method of manufacturing a printing cylinder, nor would they because the process of Kitamura is very different from the present invention and very different from the prior art cited. Kitamura is directed to a process in which a liquid photosensitive resin composition is fed into a hollow cylindrical element which is spun at a high speed to deposit the resin composition on the inner surface of the hollow cylinder and cause the resin composition to cure in situ (see e.g., claim 1). Thus, Kitamura is curing the entire surface of the resin composition through the surface of the cylinder layer. Kitamura is using multiple sources of light simply to cure the liquid resin composition. Thus, there is no teaching or suggestion in Kitamura to collimate the light source to improve image quality because there is no image that has been created. Furthermore Kitamura cannot be combined with Gelbart or Ohba, which describe cylindrical elements, because Gelbart and Ohba only describe a collimated light source that is part of a scanning head (see Gelbart, Fig. 1 and Ohba Fig. 1) and there is no teach or suggestion in any of the cited references to collimate multiple sources of light to simultaneously expose an entire surface of a photosensitive printing element to actinic radiation with light rays that strike the printing element at an angle substantially perpendicular to the surface of the printing element at the point of impact.

In addition, Trump describes a light source that is arranged internally as to the cylinder and as such it would not be possible to modify Trump to use multiple light

sources as suggested by the Examiner because the setup of Trump would not make this possible.

Finally, Nellissen is also not believed to be modifiable in the manner suggested by the Examiner because Nellissen is concerned with using a single mask instead of multiple masks to achieve the desired result. The use of multiple light sources would necessitate the need for multiple masks and thus teaches away from the desirable result that Nellissen strives to achieve.

For all of these reasons, the cited references, alone or in combination do not render obvious the claimed invention and thus Appellants respectfully submit that the rejection of claim 12 as being unpatentable over Kanga in view of Fan and Cushner, further in view of Gush, Werber, Gelbart, and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of Kitamura in view of Plambeck and Ferree be reversed.

c. Rejection of Claim 13 under 35 U.S.C. §103(a) over Kanga in view of Fan and Cushner and further in view of Gush, Werber, Gelbart and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of Kitamura in view of Plambeck and Ferree.

The Examiner asserts that the combination of Kanga, Fan and Cushner in view of Kitamura does not describe the use of collimators, wherein at least one surface substantially absorbs actinic radiation incident upon the surface and actinic radiation passes through the collimator before reaching the photopolymerizable printing plate. The Examiner uses Plambeck and Ferree for their teaching of an egg-crate baffle and concludes that it would be obvious to use a device such as an egg crate baffle to control the angle of light in imaging the cylinders of Fan and Cushner.

As described in Appellant's disclosure (see e.g., page 3), when a printing sleeve (instead of a flat printing plate) is exposed to actinic radiation, the source of actinic radiation may due to curvature of the surface, hit the photocurable surface at an angle, instead of perpendicular to the photocurable surface, resulting in loss of image quality. Furthermore, as discussed in Appellant's disclosure (see e.g., pp. 11-12), the quality of the relief image can be improved by collimating one or more sources of antic radiation. In the instant invention, this refers to the light rays striking the photosensitive printing sleeve at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact. As shown in Figs. 2 and 4 of Appellant's disclosure, the UV lamps or other actinic radiation source(s) can be collimated by positioning at least one collimator between each of the UV lamps and photopolymerizable printing sleeve. This feature is neither described nor suggested in any of the prior art cited by the Examiner.

The Examiner has cited Plambeck and Ferree for their teachings of egg-crate baffles, because such collimators are not described or claimed in either Fan or Cushner. However, neither of these references, alone or in combination describes the use of such collimators so that the light rays strike the photosensitive printing sleeve at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact in the manner described and claimed by Appellant.

Plambeck describe the use of broad uniform light sources, such as a bank of fluorescent tubular lamps, wherein extremely low angle rays can come from more remote portions of the source and are thus lower in intensity and do not ordinarily effect polymerization. In this instance, Plambeck mentions that a light-controlling baffle can be used between a light source and a negative to eliminate those rays below the minimum desired angle. Thus Plambeck does not recognize the use of a collimator to collimate the light so that light rays strike an arcuate surface (i.e., the printing sleeve) at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the

point of impact but rather only describe the use of a collimator so that low angle rays can be eliminated.

Ferree does not solve the deficiencies of Plambeck because Ferree also does not recognize the use of a collimator to collimate light so that the light rays strike an arcuate surface at an angle that is substantially perpendicular to the surface at a point of impact so that image quality can be improved. Ferree is only concerned with eliminating glare when light is used for local illumination. Thus, there is no teaching or suggestion in Ferree to use a collimator in the manner claimed in the present invention. Appellant respectfully submits that Plambeck's use of a light controlling baffle to eliminate rays below a minimum desired angle and Ferree's use of a baffle to eliminate glare, alone or in combination, do not describe or suggest the use of a collimator in accordance with the present invention and thus alone or in combination with Kanga, Fan Cushner, Gush, Werber, Gelbart, and Ohba, Nellissen, Wier, Trump, Karol and Speicher do not anticipate or render obvious the claimed invention.

For all of these reasons, the cited references, alone or in combination do not render obvious the claimed invention and thus Appellants respectfully submit that the rejection of claim 13 over Kanga in view of Fan and Cushner, further in view of Gush, Werber, Gelbart and Ohba, further in view of Nellissen, Wier, Trump, Karol and Speicher, and further in view of Kitamura and further in view of Plambeck and Ferree be reversed.

d. Rejection of Claim 15 under 35 U.S.C. §103(a) over Kanga in view of Fan and Cushner and further in view of Gush, Werber, Gelbart and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of Kitamura in view of Plambeck and Ferree.

Because claims 6-10 and 13-14 are believed to be allowable over the prior art of record for the reasons provided above, claim 15 which depends from claim 14 is also

believed to be allowable over the prior art of record and thus the rejection of claim 15 as being obvious over the prior art of record should be reversed.

e. Rejection of Claims 16-17 and 21-25 under 35 U.S.C. §103(a) over Fan in view of Cushner and further in view of Plambeck and Ferree and further in view of Nellissen, Wier, Trump, Karol and Speicher.

The Examiner asserts that Fan and Cushner describe the use of a photosensitive printing element on a cylindrical seamless cylinder but does not describe the use of collimated light for exposing the photopolymerizable layer. The Examiner uses Plambeck and Ferree to cure the deficiencies of Fan and Cushner and asserts that Plambeck and Ferree describe the use of an egg crate baffle. The Examiner concludes that it would be obvious to one skilled in the art to use an egg crate baffle to control the angle of light in imaging the cylinders of Fan and Cushner.

Appellant respectfully disagrees.

As described in the disclosure (see e.g., page 3), when a printing sleeve (instead of a flat printing plate) is exposed to actinic radiation, the source of actinic radiation may due to curvature of the surface, hit the photocurable surface at an angle, instead of perpendicular to the photocurable surface, resulting in loss of image quality. As discussed in the disclosure (see e.g., pp. 11-12), the quality of the relief image can be improved by collimating one or more sources of antic radiation. In the instant invention, this refers to the light rays striking the photosensitive printing sleeve at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact. As shown in Figs. 2 and 4, the UV lamps or other actinic radiation source(s) can be collimated by positioning at least one collimator between each of the UV lamps and photopolymerizable printing sleeve. This feature is neither described nor suggested in any of the prior art cited by the Examiner.

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The Examiner has cited Plambeck and Ferree for their teachings of egg-crate baffles, because such collimators are not described or claimed in either Fan or Cushner. However, neither of these references, alone or in combination describes the use of such collimators so that the light rays strike the photosensitive printing sleeve at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact.

Plambeck describe the use of broad uniform light sources, such as a bank of fluorescent tubular lamps, wherein extremely low angle rays can come from more remote portions of the source and are thus lower in intensity and do not ordinarily effect polymerization. In this instance, Plambeck mentions that a light-controlling baffle can be used between a light source and a negative to eliminate those rays below the minimum desired angle. Thus Plambeck does not recognize the use of a collimator to collimate the light so that light rays strike an arcuate surface (i.e., the printing sleeve) at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact but rather only describe the use of a collimator so that low angle rays can be eliminated.

Ferree does not solve the deficiencies of Plambeck because Ferree also does not recognize the use of a collimator to collimate light so that the light rays strike an arcuate surface at an angle that is substantially perpendicular to the surface at a point of impact so that image quality can be improved. Ferree is only concerned with eliminating glare when light is used for local illumination. Thus, there is no teaching or suggestion in Ferree to use a collimator in the manner claimed in the present invention. Appellant respectfully submits that Plambeck's use of a light controlling baffle to eliminate rays below a minimum desired angle and Ferree's use of a baffle to eliminate glare, alone or in combination, do not describe or suggest the use of a collimator in accordance with the present invention.

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The Examiner uses newly cited Nellissen, Wier, Trump, Karol and Speicher to cure the deficiencies of Fan, Cushner, Plambeck and Ferree. A discussion of the teachings of these references is provided above. It is respectfully submitted that Nellissen, Wier, Trump, Karol and Speicher, alone or in combination, also do not cure any of the deficiencies of Fan, Cushner, Plambeck and Ferree as noted above and thus, alone or in combination, also do not describe or suggest all of features of the claimed invention.

Furthermore, Nellissen does not cure any of the deficiencies of Fan, Cushner, Plambeck and Ferree. Nellissen does not in fact describe a cylindrical element but rather describes a **spherical** element (see e.g., col. 2, lines 61-63). As seen in Figure 2, the light is not being collimated so that it strikes the element at an angle that is substantially perpendicular to the surface of the element at the point of impact. Also, as seen in Fig. 2, even the reflected (i.e., collimated) light is striking the element at an angle that is not perpendicular to the point of impact. Thus, Nellissen does not describe or suggest a cylindrical printing element nor that the reflected light strikes the element at an angle that is substantially perpendicular at the point of impact and thus does not cure any of the deficiencies of Fan, Cushner, Plambeck and Ferree.

Trump does not cure any of the deficiencies of Fan, Cushner, Plambeck and Ferree noted above. In particular, Trump is imaging the internal surface of a cylindrical element, not the external surface as in the present invention and thus is not combinable with Fan, Cushner, Plambeck, Ferree and Nellissen in the manner suggested by the Examiner. In addition, Trump is also not concerned with imaging a photosensitive printing element but is instead concerned with high speed high resolution equipment used in the reproduction of film strips of the type employed in aerial reconnaissance. Trump is not concerned with solving the same problems as the instant invention and thus, alone or in combination with Kanga, Fan, Cushner, Werber, Gush, Gelbart and Nellissen does not anticipate or render obvious the claimed invention.

Finally, neither Karol nor Speicher cure any of the deficiencies of the prior art noted above. In particular, Karol and Speicher provide for exposing a photoresist coated cylinder by placing the cylinder between an outer mask and an inner mask (Fig. 2) and using conical mirrors to reflect the light so that it strikes either the mask or passes through the mask to impinge on the surface of the cylinder. However, neither Karol nor Speicher describe or suggest a method that is combinable with Fan, Cushner, Plambeck, Ferree and Nellissen to achieve the claimed invention because Karol and Speicher are coating the internal surface of the cylinder and not just the outside surface. Furthermore, neither Karol nor Speicher describe a mask that is part of the cylindrical printing element and that is created from a layer in the cylindrical printing element. Instead, Karol and Speicher describe a mask that is "loosely mounted" relative to the cylinder. Because the mask is only loosely mounted, it is not in intimate contact with the surface of the printing cylinder and it cannot be shown that resolution is improved as in the present application and the teachings of Karol and Speicher cannot be combined with Fan, Cushner, Plambeck, Ferree and/or Nellissen to anticipate or render obvious the clamed invention.

For all of these reasons, the cited references, alone or in combination do not render obvious the claimed invention and thus Appellants respectfully submit that the rejection of claims 16-17 and 21-25 as being unpatentable over Fan in view of Cushner, further in view of Plambeck and Ferree and further in view of Nellissen, Wier, Trump, Karol and Speicher should be reversed.

f. Rejection of Claims 17-20 under 35 U.S.C. §103(a) over Fan in view of Cushner and further in view of Plambeck and Ferree, further in view of Nellissen, Wier, Trump, Karol and Speicher and further in view of Kanga.

Because claim 16 is believed to be allowable over the prior art of record for the reasons provide above, claims 17-20 which depend directly or indirectly from claim 16 are also believed to be allowable over the prior art of record and the rejection of claims 17-20 as being unpatentable over the cited references should be reversed.

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CONCLUSION

The Examiner's rejection of claims 6-10 and 12-25 should be reversed for the following reasons:

1) Kanga in view of Fan and Cushner, further in view of Gush, Werber, Gelbart and Ohba and further in view of Nellissen, Wier, Trump, Karol and Speicher does not describe or suggest all of the features of the claimed invention because:

   a) Kanga in view of Fan and Cushner des not describe or suggest the feature of collimating the light source so that the light rays emanating from the at least one source of actinic radiation strike the photosensitive printing element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact;

   b) There is no teaching or suggestion in Gush, Werber, Gelbart, Ohba, Nellissen, Wier, Trump, Karol and Speicher, alone or in combination to collimate the light source in the manner described and claimed by Appellants and thus the combined teachings of references asserted by the Examiner do not cure the deficiencies of Kanga, Fan and Cushner; and

   c) The Examiner has not demonstrated that the combined teachings of the references anticipates or renders obvious all of the features of the claimed invention. While the various teachings of each reference have been asserted, there is no combined teaching to demonstrate that all of the features of the claimed invention are described or suggested by the prior art of record.

2) Kitamura, Plambeck and Ferree also do not cure any of the deficiencies of the prior art of record because:

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a) Kitamura does not describe or suggest collimating the light sources because Kitamura is curing the entire surface of the resin layer through the surface of the cylinder layer and is thus using multiple light sources simply to cure the liquid resin layer; and

b) Plambeck and Ferree do not cure any of the deficiencies of the prior art because Plambeck and Ferree describe the use of egg-crate baffles as collimators so that the light rays strike the photosensitive printing element at angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact in the manner described and claimed by Appellant.

3) The cited references are not combinable in the manner suggested by the Examiner and thus the combination of the cited prior art does not anticipate or render obvious all of the features of the claims of the present invention.

For all the foregoing reasons, the references cited by the Examiner are insufficient to render the pending claims anticipated and/or obvious. As a result, it is believed that the rejections proposed by the Examiner are inappropriate, should be overturned, and that this application should pass to allowance. Such action is earnestly sought.

Respectfully submitted,

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CLAIM APPENDIX

6. A method of making a hollow cylindrical printing sleeve, the method comprising:

a) providing a photosensitive printing element comprising:

i) a hollow cylindrical support layer, the hollow cylindrical support layer comprising an actinic radiation absorbing compound uniformly distributed throughout;

ii) at least one layer of photopolymerizable material deposited on the hollow cylindrical support layer; and

iii) a masking layer on top of the at least one layer of photopolymerizable material that absorbs radiation at a wavelength used to polymerize the layer of photopolymerizable material;

b) removing portions of the masking layer by exposing the masking layer to laser radiation at a selected wavelength and power;

c) exposing the layer of photopolymerizable material to actinic radiation through the hollow cylindrical support layer to create a floor layer of polymerized material;

d) exposing the surface of the cylindrical sleeve to at least one source of actinic radiation to polymerize the portions of the layer of photopolymerizable material revealed during laser ablation of the masking layer, wherein the at least one source of actinic radiation comprises one or more collimated sources of actinic radiation; and

e) developing the photosensitive printing element to remove the masking layer and the unpolymerized portions of the layer of photopolymerizable material to create a relief image on the surface of the photosensitive printing element;

wherein light rays emanating from the at least one source of actinic radiation strike the photosensitive printing element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact.

7. The method of claim 6, wherein the hollow cylindrical support layer having an actinic radiation absorbing material uniformly distributed throughout absorbs between about 85 and about 95 percent actinic radiation.

8. The method of claim 6, wherein the hollow cylindrical support layer is polyethylene terephthalate.

9. The method of claim 6, wherein the masking layer comprises a radiation absorbing compound and a binder.

10. The method of claim 9, wherein the radiation absorbing compound is selected from the group consisting of dark inorganic pigments, carbon black, and graphite.

12. The method of claim 6, wherein the at least one source of actinic radiation comprises ultraviolet lamps arranged around the photosensitive printing element, said ultraviolet lamps simultaneously exposing the entire surface of the photosensitive printing element to actinic radiation.

13. The method of claim 12, wherein the ultraviolet lamps are collimated by positioning at least one collimator between the ultraviolet lamps and the

photopolymerizable printing element, said at least one collimator having first and second opposing major faces and comprising at least one cell that extends from the first major face to the second major face, wherein the at least one collimator is defined by at least one surface that substantially absorbs actinic radiation incident upon the surface and actinic radiation passes through the collimator before reaching the photopolymerizable printing sleeve.

14. The method of claim 6, wherein the photosensitive printing element is positioned adjacent to the at least one source of actinic radiation and said photosensitive printing element is rotated about its axis to expose the entire surface of the photosensitive element to actinic radiation from the at least one source of actinic radiation.

15. The method of claim 14 wherein the at least one source of actinic radiation is an ultraviolet lamp and said ultraviolet lamp is collimated by positioning a collimator between the ultraviolet lamp and the photopolymerizable printing sleeve, said collimator having first and second opposing major faces and comprising at least one cell that extends from the first major face to the second major face, wherein the collimator is defined by at least one surface that substantially absorbs actinic radiation incident upon the surface and actinic radiation passes from the ultraviolet lamp through the collimator before reaching the photopolymerizable printing sleeve.

16. A method of making a hollow cylindrical printing sleeve, the method comprising:

a) providing a cylindrical photosensitive printing element comprising:

i) a hollow cylindrical support layer;
ii) at least one layer of photopolymerizable material deposited on the hollow cylindrical support layer; and
iii) a masking layer on top of the at least one layer of photopolymerizable material that absorbs radiation at a

wavelengths used to polymerize the layer of photopolymerizable material;

b) removing portions of the masking layer by exposing the masking layer to laser radiation at a selected wavelength and power;

c) exposing the surface of the cylindrical sleeve to at least one source of actinic radiation to polymerize the portions of the layer of photopolymerizable material revealed during selective laser removal of the masking layer; wherein the at least one source of actinic radiation comprises one or more collimated sources of actinic radiation; and

d) developing the photosensitive printing element to remove the masking layer and the unpolymerized portions of the layer of photopolymerizable material to create a relief image on the surface of the photosensitive printing element;

wherein light rays emanating from the at least one source of actinic radiation strike the photosensitive printing element at an angle that is substantially perpendicular to the surface of the photosensitive printing element at the point of impact.

17. The method of claim 16, wherein after step b) and before step c) the layer of photopolymerizable material is exposed to actinic radiation through the hollow cylindrical support layer to create a floor layer of polymerizable material.

18. The method of claim 16, wherein the hollow cylindrical support layer has an actinic radiation absorbing compound uniformly distributed throughout.

19. The method of claim 18, wherein the actinic radiation absorbing material absorbs between about 85 and about 95 percent actinic radiation.

20. The method of claim 18, wherein the hollow cylindrical support layer is polyethylene terephthalate.

21. The method of claim 16, wherein the masking layer comprises a radiation absorbing compound and a binder.

22. The method of claim 21, wherein the radiation absorbing compound is selected from the group consisting of dark inorganic pigments, carbon black, and graphite.

23. The method of claim 16, wherein the at least one source of actinic radiation are ultraviolet lamps and the ultraviolet lamps are collimated by positioning at least one collimator between the ultraviolet lamps and the photopolymerizable printing element, said at least one collimator having first and second opposing major faces and comprising at least one cell that extends from the first major face to the second major face, wherein the at least one collimator is defined by at least one surface that substantially absorbs actinic radiation incident upon the surface and actinic radiation passes through the collimator before reaching the photopolymerizable printing sleeve.

24. The method of claim 16, wherein the photosensitive printing element is positioned adjacent one source of actinic radiation and said photosensitive printing element is rotated about its axis to expose the entire surface of the photosensitive element to actinic radiation from the one source of actinic radiation.

25. The method of claim 24, wherein the one source of actinic radiation is an ultraviolet lamp and the ultraviolet lamp is collimated by positioning at least one collimator between the ultraviolet lamp and the photopolymerizable printing element,

said at least one collimator having first and second opposing major faces and comprising at least one cell that extends from the first major face to the second major face, wherein the at least one collimator is defined by at least one surface that substantially absorbs actinic radiation incident upon the surface and actinic radiation passes through the collimator before reaching the photopolymerizable printing sleeve.

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EVIDENCE APPENDIX

None

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RELATED PROCEEDINGS APPENDIX

None